A List of Agricultural Implements and Machines which have been tested in India during the year ended 30th September 1894, and of those in use which are reported to have met with more or less marked success, the latter, *i.e.*, the successful implements, being indicated by entries in italics in column 2.

Price Eight Annas.

A List of Agricultural Implements and Machines which have been tested in India during the year ended 30th September 1894, and of those in use which are reported to have met with more or less marked success, the latter, i.e., the successful implements, being indicated by entries in italics in column 2.

No.	Designation of Implements.	Use.	Special advantages or instructions.	Price.	Where procurable.	Name and Designation of Official Reporter.	Opinion.	Extent to which used by native Agriculturists.	Remarks by Official Reporters.
1	2	3	4	5	6	7	8	9	10
					PLOUGHS.				
1	E. P. plough	Ordinary ploughing.	Light, strong and cheap.	₹ a. p. 10 8 0			A good serviceable plough for light work.	Being purchased in small numbers.	.....
2	Climax plough	Ditto.	Light and cheap	6 0 0			Simple and fairly efficient.	Being purchased in fair numbers.	.....
3	B. S. plough	Ordinary ploughing, but to greater depths than Nos. 1 and 2.	Fairly strong and cheap.	23 8 0	Messrs. Massey & Co., Madras.		A copy of Öfverums Bruk plough No. 29 and suitable for ordinary ploughing with fairly strong cattle.	A small number being sold.	.....
4	Cotton soil plough No. 1.	Breaking up waste and clearing foul black cotton soil.	Strength and efficiency	65 0 0		C. Benson, Esq., M.R.A.C., Deputy Director, Department of Land Records and Agriculture, Madras.	A strong and efficient implement, which does its work well; practically unbreakable.	There was a brisk demand for these ploughs during the last season. Not liked so well by the ryots as the Swedish ploughs (Nos. 5, 6 and 7.)	.....
5	Heavy plough No. 1.	Ditto	Ditto	60 0 0	Made at Öfverums Bruk, Sweden, imported by dealers at Bellary at prices quoted.		These three ploughs are all well made, strong and effective for the work they have to do. The differences are small, but Nos. 2 and 16 appear to be best.	A very large demand for these ploughs sprang up last year in the Bellary and Anantapur districts, which was in excess of the supply. The ploughs were introduced there some twelve years ago, and their use has been gradually extending, till they	.....
6	Heavy plough No. 2.			60 0 0					
7	Heavy plough No. 16.			70 0 0					

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1	2	3	4	5	6	7	8	9	10
					PLOUGHS—*contd.*				
				R a. p.				are now quite a common object in the special ploughing season for the work to be done.	
8	*Sibpur wrought-iron soil-inverting plough.*	Soil-inverting	Being made of wrought-iron, can be easily repaired. Is a cheap soil-inverting plough.	7 0 0	Agricultural Department, Bengal.	Commissioner of Presidency Division.	...	.....	Two Sibpur ploughs were tested in the Cossimbazar Estate in Murshidabad. They were found too heavy for the ordinary country bullocks.
						Collector of Cuttack.	...	.....	The Sibpur ploughs were tested in killa Madhupur under the Court of Wards, and were found too heavy and unwieldy for the weak bullocks of this part of the district, and the raiyats did not like them.
						Agricultural Department, Bengal.	...	.....	The following extract is taken from the Annual Agricultural Report of the Director of Land Records and Agriculture, Bengal, for 1893-94 :— "*The Sibpur plough.*—From the reports received from persons to whom Sibpur ploughs have been supplied, it appears that the plough is well adapted for breaking up light soils, although it is not found suitable for working in stiff, low, wet lands. It was noticed in the last annual report that Mr. J. Crowdy, of Darbhanga, has in previous years, given a favourable opinion on this plough. He now reports that he finds the plough useful, but that it is not as strongly made as the 'Hindustan' plough, which is more useful for ploughing up unbroken land. Six Sibpur ploughs were purchased during the year from the Department by Mr. Pal Chowdhry, a Zamindar in Nadiya district, who reports that they did their work on his farm more effectively than the country plough. The Manager of the Dighapatia Estate reports that the plough is too heavy to be worked by ordinary country bullocks. The Superintendent of the Purnea Jail reports that the plough worked well during the year under report. The Khas Mehal Tahsildar,

									Serampore, states that though the plough has been introduced amongst the raiyats of the estates under his charge, it does not find favour with them. The Tahsildar is of opinion that there is no prospect of overcoming the firm conviction of the raiyats that the country plough is best suited to their soil and bullocks. The Manager of the Navagram Estate in Midnapore reports that the plough is well suited for turning up light land, but he finds that the share wears away when the implement is worked in very sandy soils. The Commissioner of Rajshahi reports that the Sibpur plough, which was introduced last year into the Maldwar Estate in Dinajpore, is said to be an improvement compared with the kind of implement previously used in the estate."
						Superintendent of Farms, Bombay, and District Deputy Collector, Broach.	...	.....	In the opinion of the Director of Land Records and Agriculture, this implement is cheap, light of draught and serviceable when the soil is moist and easily moved. It is too frail an implement to be used in the soils of the Deccan except during the monsoon, and even then cannot be used so soon after rain as a wooden indigenous implement can. It has neither the strength nor the durability of a well-constructed Deccan plough, nor has it any advantage over that implement in penetrative power or otherwise. It has a better chance of being successfully introduced into Gujarat than into the Deccan, because in Gujarat the indigenous plough, in common use, is by no means an effective implement. The District Deputy Collector, Broach, reports that of the twelve ploughs purchased, four are actually in use at present, and feels sure that the remaining eight will come into favour in due course, the advantages of the plough being that it works much deeper and turns over a given area of land far more expeditiously than the Gujarat plough.
9	*Joseph's plough, Hindustani.*	For ploughing light soil.	Cheapness and effective work in preliminary preparation of rough land or land long uncared for. Effective and simple.	6 0 0 to 15 0 0	Messrs. Joseph & Co., Bankipore and Calcutta.	Collector of Monghyr.	Particularly suited to one who wants to keep a large cultivation in proper order.	Used in Begusarai and other indigo concerns. Not used by natives at all.	Mr. Robertson, of Daulatpur Factory, writes that he has used Joseph's ploughs for seven or eight years, and the number of ploughs he used yearly increased.
10	English plough (maker unknown.)	...	.....	12 0 0	Calcutta . .	Collector of Monghyr.	Indifferent .	.....	Used in indigo factories.

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1	2	3	4	5	6	7	8	9	10
				R a. p.	**PLOUGHS**—*contd.*				
11	*Ransome's English plough.*	For breaking up the soil before using the ordinary native plough.	.....	10 0 0	Messrs. Joseph & Co., Bankipore and Calcutta.	Collector of Monghyr.	Found serviceable. Answers very well the purpose of being used before the native ploughs.	.....	.....
12	*Bhagalpur wrought-iron plough.*	...	Made entirely of wrought-iron with moveable steel share, which admits of being regulated for different sizes of bullocks.	5 0 0	Begusarai Factory.	Ditto . .	Satisfactorily worked and appreciated.	Extensively used.	.....
13	*S.S. preparation ploughs.*	...	Light, good and cheap. All ploughs fit on to the same stock.	2 12 0	.....	Mr. Edmund T. Sealy, District Engineer, Champarun.	.....	.....	Mr. Edmund T. Sealy, District Engineer of Champarun, states that these ploughs are much used by planters and a few are sold to natives, but owing to the difficulty in getting them repaired by the village blacksmiths, they do not get a ready sale among native cultivators. One hundred and ninety-five S.S. preparation ploughs, 337 shares, and 221 shares for turning plough were sold during the year.
14	Preparation shares.			0 12 0					
15	Shares for turning plough.			1 4 0					
16	Turning plough complete			7 0 0					
17	*Watt's Chain plough.*	Inversion of soil and ploughing heavy soils.	Easy draught, adaptability to different modes of preparing soils.	7 0 0	Government Farm, Cawnpur.	Syed Mahomed Hadi, Assistant Director, Department of Land Records and Agriculture, North-Western Provinces and Oudh.	Maintains the same reputation as reported in the previous years.	Is used by many well-to-do cultivators throughout the N.-W. Provinces. Some have been indented for from other provinces also.	Twenty sold, eight given on trial and sixteen on hire. Has attracted much attention in the Western Districts of the North-Western Provinces.
				21 0 0	Ditto . .	Deputy Collector, Naushahro, Hyderabad.	.....	.....	The Director of Land Records and Agriculture, Bombay, reports that this plough was tried by the Mukhtyarkar of Naushahro, who reports that the plough turns up the earth better than a Sindhi 'Har' does, but requires two pairs of bullocks for working it; so it cannot be ordinarily useful; and that where the land is very rough even two pairs of bullocks will not be sufficient for it.
18	*Kaisar plough* .	Inversion of soil	Cheapness, lightness (being only 16 seers in weight) and sim-	5 0 0	Ditto . .	Syed Mahomed Hadi, Assistant Director, De-	Maintains the same reputation as reported in	The plough is used by many well-to-do cultivators in the	Fourteen sold; three given on trial.

			plicity of construction. The share can be easily removed any time and fixed again. The iron parts are made of ordinary sheet iron, so that repairs can be done by an ordinary village mistri.			partment of Land Records and Agriculture. North Western Provinces and Oudh.	the previous years.	districts of Aligarh, Bulandshahr, and Muzaffarnagar.	
19	*Baldeo plough, Cawnpur made.*	Ploughing light soils.	Cheap, simple and effective and inverts the soil.	2 8 0	Ditto .	Ditto .	Ditto . .	Is used by many cultivators in the N.-W. Provinces and is still demanded by many.	Three hundred sold during the last year.
20	The improved Baldeo plough.	. Ditto . .	Cheap, simple and effective and is stronger than the old Baldeo plough.	3 4 0	Ditto .	Ditto .	This form of Baldeo plough is stronger, larger in size and more durable, goes deeper in the ground and inverts the soil more effectively. It ploughs half an acre in about eight hours to a depth of four inches, the width of the furrow being 6½ inches.	Not yet introduced among the natives.	The improvement which has been recently devised at the Cawnpore farm workshop consists in the attachment of a separate mould board of thick sheet iron which will not break, and can be removed from the sole easily. In the old Baldeo plough if the mould board (which is now of cast-iron) breaks, the whole of the iron work of the plough becomes useless, as the sole and the mould board are formed in one piece. In the improved form this disadvantage has been overcome, and either the sole or the mould board can, if damaged, be replaced by a new one.
21	The improved Duplex plough.	Ploughing and sowing.	Strength, durability, lightness and facility of repair.	4 0 0	Ditto	Ditto .	All the iron work is made of wrought-iron and is therefore very strong. The various iron parts, *viz.*, the sole, the share and the body are separate, and therefore if one gets damaged, the whole iron work does not become useless. The plough can be used both for ploughing and sowing.	Ditto	In the improved form of the plough, which has just been made at the Cawnpore farm, an arrangement has been provided whereby the iron sole and the body can be taken off and a wooden piece, to which a share is attached, substituted, and the plough can then be used to make furrows for seed sowing.

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					PLOUGHS—*contd.*				
22	Porter plough	Ploughing	Cheapness, facility of working, strength? Can be made or repaired by the ordinary village blacksmith. Turns up soil.	R a. p. 2 6 0	Government Farm, Cawnpur.	Syed Mahomed Hadi, Assistant Director, Department of Land Records and Agriculture, North-Western Provinces and Oudh.	Appears to be a very useful plough and one which the ordinary cultivators would have little hesitation in adopting.	Is said to be in use to a certain extent in Pargana Arail of the Allahabad district.	The plough is said to have been invented by Mahabir Pershad Narain Singh, Rao Bahadur, Secretary to the Porter Agricultural Association, Allahabad, and is named after Mr. Porter, once Collector of that district. It is really an improvement over the indigenous plough of Allahabad, called the *Tharia*, and the improvement consists only in the attachment by means of nails of a small mould board of sheet iron to the left half of the wooden sole. The following table shows the result of the trials made at the Experimental Farm with the Porter and two other ploughs :—
23	The Fire Fly wheel garden plough.	Ploughing small beds in gardens and patches of fields in which seed may have failed to germinate.	Can be worked easily by one man with the hand only. Turns up soil to a depth of 3". Very cheap and durable. The depth can be re-	10 0 0	Messrs. Lloyd, Lawrence & Co., London, and their Agents, T. E. Thomson & Co., Calcutta.	Ditto	Is light and cheap. It is hoped it may gradually get into use for garden work.	Introduced among the natives to a very limited extent.	Only one sold during the last year.

Name of Plough.	Land ploughed.	Time taken.	Depth.	Width of furrow.
	Acre.	Hours.	Inches.	Inches.
Porter plough	¼	10	4½	4½
Nagra plough, *i.e.*, the indigenous plough in use in the Cawnpore district.	¼	9½	3½	4½
Baldeo plough	¼	10½	3	6

The sample of the Porter plough received for trial was not a very good one. Mr. Hadi is of opinion that if a mould board of thick sheet iron be attached to the plough, it would be the cheapest soil-turning plough that a cultivator of limited means can get hold of In its present form it does not, however, turn up the soil as effectively as the Baldeo plough.

			gulated by means of a screw arrangement.						
24	The Planet Jr. double wheel hoe, rake and plough combined.	Ridging and earthing up plants, weeding and cultivating.	It is a very useful tool for ridging and earthing up crops, such as potatoes when sown in rows. It throws up earth on both sides of the stem to a height of 4 inches without injuring the plants.	35 0 0	Ditto .	Ditto .	It has been thoroughly tried at the farm, and found very useful, specially for earthing up plants when detachable leaf guards are fitted to the hoe.	Not introduced among the native agriculturists as yet.	One has been indented for lately from Rai Bareilly.
25	*Swedish Plough*	.....	Efficiency in ploughing and in inverting the soil, especially in breaking up grasslands.	21 10 0	Akerbunks Redshap & Co., Öfveruns Bruk, Sweden.	Director of Land Records and Agriculture, Central Provinces.	See column 10.	Some have been procured from Madras, by landholders in the Hoshangabad district.	Has continued to do very good work on the Nagpur Farm.
26	Burlie's and other improved ploughs.	Ploughing	Ploughs deeper and goes smoother.	30 0 0 to 50 0 0	Babugarh *vid* Meerut.	Rai Maya Das, E.A.C., Manager, Mamdot, Punjab.	These are good ploughs, but native agriculturists do not quite take to them.	About 60 acres of land were ploughed by these ploughs with some difficulty by horse-power.	.....
27	Ransome's Turnwrest plough.	For deep ploughing in moist soil.	The most decided advantage is that it turns a clean furrow 10 inches deep in moist soil if yoked with two pairs of strong bullocks. Another advantage is that the mould board and share can easily and quickly be adjusted to one side of the plough as it goes in one direction and on the other side of the plough as it returns, thus obviating the necessity of ploughing the field in lands or sections which an ordinary native ploughman finds difficulty in doing properly with an ordinary mould board plough; moreover, in doing so, bad work generally results and time is wasted.	55 0 0	F. Shallis, Esq., Engineer and Implement Agent, Bombay.	Superintendent of Farms, Bombay.	.....	A native agriculturist, after thoroughly trying the Poona farm plough, ordered one from the manufacturers in England. Used more extensively than any other plough for general cultivation on the Baroda College Farm. There it does excellent work on both heavy and light soils. It is not likely that this or the Swedish wheeled plough will be taken up by ordinary cultivators in the Deccan, the cost being prohibitive.	The Superintendent of Farms believes this and the Swedish wheeled plough to be good implements for the heavy tillage necessarily required for sugarcane cultivation, and as regards their adaptiveness for the purp se, intends to have an exhaustive trial in comparison with the native plough, when the proper season arrives. Sugarcane cultivators are well-to-do, and will not hesitate to use a tillage implement which does effective work and saves time, the latter consideration being specially important for sugarcane cultivation, as the crop must be planted by a certain date if irrigation water is given from the canal.

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					PLOUGHS—*concld.*				
				₹ a. p.					
28	The Swedish wheeled plough.	Soil inversion	Deep ploughing	50 0 0	N. H. Patuck, Esq., Engineer and Implement Agent, 10 Lane Khetavady, Bombay.	Superintendent of Farms, Bombay.	.....	None in Bombay	The plough is a strongly constructed wheeled plough of ordinary English pattern. It is the same plough as has been reported to have been sold in large numbers to *bonâ fide* cultivators in the Bellary district of Madras. It is not so well adapted for ordinary or for deep cultivation as the Turnwrest plough.
					WINNOWING, THRESHING AND CLEANING MACHINES, CHAFF-CUTTERS, ETC.				
29	Thrashing machine. (Thomson and Mylne's.)	.....	The inventors report—"It has been tried by some of our raiyats and given satisfactory results, produced in about half the time taken by the usual mode of treading out with cattle. Another very great advantage is that the straw and grain entirely escape pollution from the droppings of the cattle employed and the foot-and-mouth sores which they contract when treading out the grain and making *bhoosa*."	...	Messrs. Thomson and Mylne, of Behea, Shahabad, Bengal.	Commissioner of Patna.	.....	.....	The Commissioner of Patna reports that the machine was tested by the inventors who have recently applied for letters-patent. The machine has been lately invented.
30	*Chaff-cutter*	For cutting fodder.	Effective and simple.	10 0 0	Messrs. Joseph & Co., Bankipore, Bengal.	Collector of Monghyr.	Very good	Used in Begusarai and other factories.	Used for 20 to 21 years.
31	*Mayforth's hand-threshers.*	...	Cheapness and rapidity in threshing wheat.	127 6 0	Mayforth & Co., Frankfort-on-Main, Germany.	Director, Department of Land Records and Agriculture, Central Provinces.	See column 10	One was purchased for use in the Hoshungabad district, but the non-crushing of the straw is considered by the people a great defect.	The Director reports that the thresher has continued to do very good work on the Nagpur Farm.

32	Dell's Winnower	Winnowing grain	Winnowing and cleaning thrashed grain by hand-power. The machine requires only two men to work it, one drives the motive wheel and the other feeds the machine.	265 0 0	Messrs. Dell & Co., Mark Lane, London.	Syed Mahomed Hadi, Assistant Director, Department of Land Records and Agriculture, North-Western Provinces and Oudh.	Works very well indeed and completely separates the chaff from the grain.	Not used by natives in these provinces except by certain owners of mills for grinding corn.	In a trial made at the Cawnpore Farm, this winnower was found to winnow 60 seers of mixed chaff and grain (previously trodden by bullocks) in 12 minutes.
						Director Department of Land Records and Agriculture, Central Provinces.	See column 10 .	Used by grain export agents but not by cultivators.	The Director reports that the winnower has continued to do very good work on the Nagpur Farm.
33	*R. Hunt's kibbling machine.*	For crushing all sorts of grain.	Lightness and simplicity, rapidity of work, economy of labour.	35 0 0	Ditto . .	Syed Mahomed Hadi, Assistant Director, Department of Land Records and Agriculture, North-Western Provinces and Oudh.	Maintains the reputation which it had acquired in previous years.	It is used by many well-to-do natives now throughout the N.-W. Provinces. Other provinces have also indented for some.	Twelve sold and four given on trial during the year.
34	*Nahan Kibbling machine.*	For kibbling all sorts of grain.	These kibblers are merely imitations of Messrs. R. Hunt's the "Simplex;" they are of three different sizes.	No. 1, R25 „ 2, „ 20 „ 3, „ 10	Sirmour Factory, Nahan, near Amballa, and Government Farm, Cawnpur.	Ditto . .	This is an imitation of R. Hunt's Kibbler the "Simplex" but inferior in workmanship.	This machine being cheap, people often come forward to buy it.	Sold No. 2 . . . . . 4 „ „ 3 . . . . . 1 Total 5
35	*R. Hunt's Chaff-cutter, the "Simplex."*	For chopping fodder.	Economy of labour, efficiency and durability.	R35 0 0	Messrs. R. Hunt & Co., England, and Government Farm, Cawnpur.	Ditto . .	Maintains its reputation.	Used by many people in the N.-W. Provinces.	Eight sold during the last year and four given on trial.
36	Spangburg Chaff-cutter.	Ditto . .	Strength and facility of work.	8 0 0	Ifverums Pruk, Ofverums, Sweden, and their Agent G. de Pildt, Esq., Swedish Export Society, Meadow Street, Bombay.	Ditto . .	Does its work well but is not so handy as the R. Hunt's chaff cutter the "Simplex."	Not used by natives.	Was exhibited this year at the Aligarh Agricultural Fair by Mr. Keventer, who had obtained it from the Swedish Consul at Bombay.

WATER-LIFTS, CHAIN-PUMPS, BUCKETS, ETC.

37	Baldeo *balte* or water-lift.	Lifting water from tank or canal.	A useful lift for raising water from a depth of 5 feet. Sheet iron and wood enter into the construction of this machine so that it can be made even by the village	50 0 0	Government Farm, Cawnpur.	Syed Mahomed Hadi, Assistant Director, Department of Land Records and Agriculture, North-Western Provinces and Oudh.	Is a simple and ingenious contrivance for raising water from a tank or canal for irrigation purposes.	One was sold last year to a zamindar of Aligarh, and one has been supplied this year to the Manager, Court of Wards Estate, Sultanpur (Oudh).	An improvement has recently been made in the water lift by the mistri of the Government Farm, Cawnpur, and it is now capable of raising water in greater quantity in a given time than it did before.

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				WATER-LIFTS, CHAIN-PUMPS, BUCKETS, ETC.—*concld.*					
			mistri. It consists of two sheet iron troughs which ascend and descend alternately. The arrangement of the pulleys and the ropes is such that the bullock (only one being required) which works it has not to reverse its motion.	*R a. p.*					
38	Barakar water-lift.	Used for lifting water.	All its parts, except wheel, axle, handle and chain, are made of cast-iron. Light and easy to work.	35 0 0 to 55 0 0	Barakar Iron Works.	Commissioner of Presidency Division.	.....	.....	Two Barakar pumps were tested in the estate of the minor zamindar of Cossimbazar in Murshidabad, but their working was found to be more expensive than that of the country method of irrigation.
						The Director, Agricultural Department, Bengal.	.....	.....	The Manager of the Dighapatia Estate, Rajshahi, reported that a pump supplied in 1891-92 worked admirably during 1893-94. During the year one mouth-pipe for a drain pump was sold by the Barakar Iron Works.
39	Hauser's bucket water-lift.	Ditto . .	.....	.....	.....	Ditto . .	.....	.....	One of Mr. Hauser's lifts was used at Dumraon, and found useful for lifting water for drinking purposes from wells 25 feet deep.
40	Water-lift .	.....	Claims economy of labour and efficiency.	30 0 0 to 100 0 0 (according to materials used).	C. K. Suba Rao, Saidapet, Madras.	C. Benson, Esq., M. R. A. C., Deputy Director, Department of Land Records and Agriculture, Madras.	On a careful trial the lift was found to compare very favourably with the ordinary single *mhote*, but it is still to be shown how it will, in regular and continuous working, stand the strain.	.....	.....

41	Sultan water-lift	.....	Self-emptying buckets, bullocks worked on the flat.	125 0 0	Messrs. Sultan & Co., Madras.	Ditto	Has not yet been subjected to trial. The self-emptying arrangement is ingenious, but continued use is necessary to show how it will stand ordinary wear and tear. That the cattle work on the flat is advantageous, but the draught is necessarily very heavy.	.....	.....
42	*Cawnpur Chain pump.*	Lifting water from a depth of 3 to 32 feet.	Very efficient and useful.	40 0 0 to 65 0 0 (according to the length of pipe.)	Government Farm, Cawnpur.	Syed Mahomed Hadi, Assistant Director, Department of Land Records and Agriculture, North-Western Provinces and Oudh.	Maintains the reputation which it had acquired in the previous years.	Is used by many well-to do agriculturists throughout the N.-W. Provinces. Some have been indented for from other provinces.	Thirty sold during the year, five given on trial and five on hire.
43	*Improved Cawnpur double pump.*	For lifting water from canal or pond.	Two Cawnpur 5 feet or 6 feet chain pumps of 4½ inches diameter are worked at a time by means of a gearing and only one bullock is required to work the same. It raises 8,200 cubic feet of water per hour.	250 0 0	Ditto . .	Ditto . .	Has proved to be an excellent lift for raising water from a depth of 4 to 5½ feet.	The heavy cost of R250 is against its sale.	Has continued to do very good work at the Cawnpur Experimental Farm.
44	Sullivan's water-lift.	For raising water from wells.	.....	322 4 0	C. C. Sullivan, Esq., Rurki.	Director, Department of Land Records and Agriculture, Central Provinces.	See column 10	.....	The lift developes a great deal of friction and is apparently harder on the bullocks than the ordinary bullock-lift. It soon got out of order.

BONE-CRUSHERS, SUGAR AND FLOUR MILLS, ETC.

45	Bone-mill (maker not known).	.....	.....	75 0 0	England . .	Collector of Monghyr.	.....	.....	Used only in indigo factories.

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1	2	3		5	6	7	8	9	10
			BONE-CRUSHERS, SUGAR AND FLOUR MILLS, ETC.—*contd.*						
46	Shank's Sugar Mill.	Crushing sugar-cane.	Economy and efficiency.	*R a. p.* Varying according to make.	Messrs. Gordon, Woodroffe & Co., Agents, Madras.	C. Benson, Esq., M.R.A.C., Deputy Director of Land Records and Agriculture, Madras.	There is nothing to add to previously recorded opinions.	A number of such mills is sold annually, but the demand is naturally smaller than it was.	.....
47	Massey's Sugar Mill.			140 0 0	Messrs. Massey & Co., Madras.				
48	*Behcea Sugar Mills* (two-rollers and three-rollers).	Cane-crushing .	Economy and efficiency.	50 0 0 to 140 0 0	Messrs. Thomson and Mylne, Behcea, and local agents.	W. H. Bolton, Esq., Head Assistant Collector, Jerruck, Karachi.	.....	.....	Mr. W. H. Bolton reports:—"Five mills were working during the year, twelve more have been ordered and more purchases are expected. Two of the mills in use worked steadily throughout the pressing season, and offers were made to rent them. The mill is easily adjusted and portable and can be worked by one or two bullocks. One camel crushes canes quickly and thoroughly.
						C. Benson, Esq., M.R.A.C., Deputy Director of Land Records and Agriculture, Madras.	There is nothing to add to previously recorded opinions.	A number of such mills is sold annually, but the demand is naturally smaller than it was.	.....
						Director, Department of Land Records and Agriculture, Punjab.	.....	The district officers, Lahore, Hoshiarpur and Rohtak, report that these mills continue to be used and are liked; that they are thoroughly appreciated and are driving the old *Kohlu* out of use.	.....
						Director, Department of Land Records and Agriculture, Central Provinces.	See column 10 .	Established in one district (Betul) and coming into use in another (Chanda).	Has continued to do very good work on the Nagpur Farms.

49	*Steel Roller Mill (Rogers).*	.....	Efficiency in the extraction of cane juice and improvement in quality of syrup.	95 0 0	A. Rogers, Esq., Mozufferp o r e, Tirhoot.	Ditto .	Ditto .	One purchased by a landlord of the Bhandara District and much appreciated.	Ditto	Ditto.
50	*The Poona Iron Sugar Mill.*	.....	.....	90 0 0 to 125 0 0 according to size.	Chiefly of Mr. Narayan Tukaram, Karanjkar, Somvarpet, and of Mr. Ramchand, Bhaichand, Bhavanipet, Poona.	Director, Department of Land Records and Agric u l t u r e, Bombay.	.....	Largely used. Exported to distant places in India.	Mills of three sizes are now sold, one weighing about 19½ maunds, another 16½ maunds, and the third about 12 maunds. The prices vary according to competition and demand from R125 to R115, R110 to R105, and R95 to R90 respectively. The first two are three rollered and the third has two rollers ; the biggest size is now in greatest demand.	
51	Albi's Flour Mill	Making flour .	Grinding wheat into flour by steam-power. In the course of grinding the grain goes through the following five processes :— 1. It is passed through two sets of steel discs with pegs and is then brushed out through a sieve. This sieve is to cleanse t h e grain of dirt. The grain now falls to the ground a n d from t h e r e has to be removed to the hopper of process No. 3. 2. It is freed from the dirt by an exhaust f a n working in connection with the above. 3. It being cleaned now p a s s e s through steel rollers which crush the grain preparatory to its grinding. 4. The crushed grain	Francs 1,150	Fritz Marti, Paris (France).	Syed Mahomed Hadi, Assistant Director of Land Records and Agricu l t u r e, North-Western Provinces and Oudh.	Has not yet worked quite satisfactorily.	Not used by natives .	The Director, Agricultural Department, reports as follows :— "This mill was received this year at the Farm from the Government of India for trial. Some difficulty was felt at first in setting and working it. Messrs. Cooper, Allen & Co., of Cawnpore, had the courtesy at my request to send Mr. Charter, their engineer, to assist me in trying the machine, and a trial was made in his presence on the 26th July 1894, but the amount of work turned out was small, *i.e.*, 35 seers of flour was made in four hours and 3·42 seers of coal were consumed for every seer of flour obtained. Two more trials have been made since and in one of them, when the mill might be said to have done best (having been worked with an eight horse-power engine at a steam pressure of 35 lbs. to the square inch), one maund of wheat was ground in 40 minutes and the products were as under—	

	Sr.	Ch.
No. 1 Very fine flour . .	0	10
„ 2 Fine flour . . .	0	12
„ 3 Ordinary . . .	4	3
„ 4 Coarse . . .	12	4
„ 5 Bruised and kibbled grain (Dalia) . . .	21	12
Loss . . .	0	7
	40	0

The percentage of No. 5 is not fit for use until it be ground. A gain in a native stone mill (*Janta*) was so high that the Albi's mill cannot be admitted to have done satisfactory work. The quality of products Nos. 1, 2 and 3 was particularly good, but that of No. 4 was not so, the last-mentioned product being unfit to be used for making bread without being passed through a fine sieve. At the above rate the mill would grind 18 maunds of wheat in 12 hours and the cost would be :—

	R	*a.*	*p.*
(1) Five maunds of coal at R0-10-0 per maund	3	2	0
(2) Pay of the Engine Driver per diem .	0	8	0

A List of Agricultural Implements and Machines which have been tested in India during the year ended 30th September 1894, and of those in use which are reported to have met with more or less marked success, the latter, i.e., the successful implements being indicated by entries in italics in column 2—continued.

No.	Designation of Implements.	Use.	Special advantages or instructions.	Price.	Where procurable.	Name and Designation of Official Reporter.	Opinion.	Extent to which used by native Agriculturists.	Remarks by Official Reporters.
1	2	3	4	5	6	7	8	9	10
					BONE-CRUSHERS, SUGAR AND FLOUR MILLS, ETC.—*concld.*				
			then passes between a pair of 9-inch steel discs which reduce it to flour. 5. The flour thus made now falls into a box of 4 compartments with sieves and a revolving brush which effects the sorting of the flour into 4 different grades.	*R a. p.*					(3) Wages of fireman . . . . *R a. p.* 0 3 0 (4) Two Beldars for weighing, storing, feeding wheat and collecting flour, etc., etc., etc. . . . . 0 5 0 (5) One reza (boy) . . . . 0 2 0 (6) Oil, tallow, jute, etc., etc., per day . 1 4 0 Total cost . 5 8 0 Total R5-8, *i.e.*, nearly 4 annas 11 pies per maund, leaving the question of wear and tear of the machinery out of account. The cost of grinding wheat by the ordinary flour mill working at Cawnpore with water-power is 6 annas per maund, but the Cawnpore flour is uniform in quality and similar to No. 2 turned out by Albi's mill."
					HOES, HARROWS, GRUBBERS, ETC.				
52	*Cultivator with 3 shares* (made at Daulatpur).	To break up land after some other plough has been used.	Brings weed and jungle to the surface.	7 8 0 (about).	Can be made anywhere from pattern.	Collector of Monghyr.	Is indispensable in getting a large area cultivated and prepared in time without great expenditure of manual labour.	Not used by natives, except when borrowed.	Used for 20 to 21 years.
53	Cultivators with 3, 4, 5 and 6 shares (the share being a native plough).	.....	.....	1 0 0 to 15 0 0	Made at Majhouli Factory by carpenters.	Ditto	Indifferent .	Used extensively	.....
54	*Planet Jr. hand-hoes* (with one or two wheels).	To clean interspaces between rows of standing crops.	.....	Two-wheel R37-8, one-wheel R24.	Messrs. T. E. Thomson & Co., Calcutta.	Mr. B. C. Basu, Assistant Director, Department of Land Records and Agriculture, Bengal.	Very useful .	.....	The Assistant Director, Agricultural Department, Bengal, states that the favourable opinion previously recorded by Mr. Pal Chowdhry, of Natuda, in the Nadia district, was fully confirmed by last year's experience. Four hoes were supplied to him by the Bengal Agricultural Department and were used in the cultivation of chillies in 23 bighas of land. The cost of hoeing with these implements is reported

									to have been considerably less than the cost of hand-hoeing.
55	Cross-kill roller .	To crush clods .	.....	.....	.....	Ditto .	.....	.....	The cross-kill roller was tried on the Dumraon Farm and found to work satisfactorily.
56	Gahan . .	Pulverising tilled soils, harrowing and removing dry grass and weeds from the seed-bed.	Simplicity of construction and cheapness. Made entirely of wood; consists of a plank with wooden tynes on the bottom surface.	R1-14-0	Saharanpur .	Syed Mahomed Hadi, Assistant Director, Department of Land Records and Agriculture, North-Western Provinces and Oudh.	Not very durable but good for the price. Works well enough; seems specially useful for preparing seed-beds for vegetables.	Used by native agriculturists in the Saharanpur district.	Is the only native harrow used by native cultivators in the N.-W Provinces. Fifteen have been indented for from Rai Bareilly this year.
				COTTON GINS.					
57	*Cotton gin* .	.....	.....	.....	.....	Director, Department of Land and Records Agriculture, Punjab.	.....	.....	The Director states that this machine has again been set to work in Shahpur and is working successfully. It gins about 15 maunds of cotton every day and works 12 hours in a day and night. Fifteen labourers work on this, and their wages, including cost of wood, etc., is R20 per diem.
				MISCELLANEOUS.					
58	Reaper . .	To reap harvest .	It can be worked by horses or bullocks. is useful when there is abundant crops and labour very scarce. This machine, if successfully worked with two pairs of horses or bullocks used alternately, can accomplish as much work as perhaps 50 men can perform with difficulty.	About R700 delivered at Ferozepur.	Bombay, through Messrs. McHinch & Co., Karachi.	Rai Maya Das, E. A. C., Manager, Mamdot, Punjab.	As a first trial it was a success.	Some 200 acres of wheat were reaped in April and May 1894.	The Agricultural Director reports as follows:— "The necessity of such a machine was felt after successive years of good crops, nearly one-third of which crop could not be gathered for want of labour. and was mostly destroyed by heavy rain. The Mamdot Court of Wards therefore decided to buy this machine for the stud farm. Some 200 acres of wheat and oats, etc., were successfully reaped with but few interruptions. Bullocks, however, did not work and horses too were not quite successful, but a pair of camels did the work very well, much to the surprise of the native agriculturists who have offered to hire the machine on fair terms, but as yet there is hardly any individual zamindar who can afford to buy and manage to keep such a machine going in this part of the Punjab. Further trials will. however, show how far it is practicable to work this machine in this part of the country."
59	*Walter A. Wood's Sulky Mower and Rake.*	.....	Rapidity in hay-making.	487 10 0	Messrs. Macbeth & Co., Bombay.	Director, Department of Land Records and Agriculture, Central Provinces.	See column 10 .	*Nil.*	Worked very satisfactorily on grass lands at Pachmarhi.
60	The Senwái Press	Making Senwái (Vermicelli) from wheat	Simplicity of construction and rapidity of work.	8 0 0	Government Farm, Cawnpur.	Syed Mahomed Hadi, Assistant Director of	Is a good contrivance, and no doubt useful for	Not known .	Has lately been made at the Cawnpur Farm Workshop.

A list of Agricultural Implements and Machines which have been tested in India during the year ended 30th September 1894, and of those in use which are reported to have met with more or less marked success, the latter, i.e., the successful implements being indicated by entries in italics in column 2—concluded.

No.	Designation of Implements.	Use.	Special advantages or instructions.	Price.	Where procurable.	Name and Designation of Official Reporter.	Opinion.	Extent to which used by native Agriculturists.	Remarks by Official Reporters.
1	2	3	4	5	6	7	8	9	10
					MISCELLANEOUS—*concld.*				
		flour kneaded by the hand.		*R a. p.*		Land Records and Agriculture, North-Western Provinces and Oudh.	the purpose for which it has been devised.		
61	*Laval Separator "the Baby."*	Cream separating	The cream can be separated from the milk immediately after the milk is drawn.	235 0 0	N. H. Patuck, 10 Lane, Khetawady, Bombay.	Syed Mahomed Hadi, Assistant Director, Department of Land Records and Agriculture, North-Western Provinces and Oudh.	The machine is solid and well made and of great use in hot climates	Used by R. C. Dutt, Lake Dairy, Naini Tal.	After the cream has been extracted the skim milk is perfectly good for cooking purposes and can be used even to make Indian sweetmeats with. It separates one maund and a half of milk in an hour.
62	*The Windsor Separator.*	Ditto . .	Ditto . .	450 0 0	Ditto . .	Ditto . .	Ditto . .	Not used by natives .	The remarks made regarding No. 61 apply to this machine equally with the addition that it separates 4½ maunds of milk per hour.
63	*Victoria Churn*	Used for churning cream or whole milk.	Complete separation of butter from butter-milk without either being touched by the hand.	60 0 0	Dairy Supply Company, Museum Street, London	Ditto . .	Very durable and perfectly efficient.	Used by R. C. Dutt, Lake Dairy, Naini Tal.	.....
64	*Cunningham Butter Worker.*	Used for separating water from butter.	Butter can be separated from water without being touched with the hand.	50 0 0	Ditto . .	Ditto . .	It is a simple but very useful machine.	Ditto . .	10 lbs. of butter can be worked at a time.
65	*Set of cheese making apparatus—* *(a) Cheese tubs.* *(b) Do. press.* *(c) Do. curd mill.*	Cheese-making .	Manufacture of European cheese in India.	300 0 0	Ditto . .	Ditto . .	The machines are durable and well made and make fairly good cheese.	Ditto . .	This set of appliances has been made use of only occasionally as cheese-making has hitherto proved to be unsuccessful owing to the high temperature of the country and has therefore been done on a small scale.
66	Farmer's Alpha Separator.	Cream separating	Separates the cream from the milk more perfectly than Nos. 61 and 62 above.	600 0 0	Ditto . .	Ditto . .	The best hand separator known at present.	Government Dairies, Aligarh and Lucknow.	Separates cream from 6 maunds of milk in an hour.

67	Holstein Butter Worker.	Used for separating water from butter.	A large quantity of butter can be worked with this in a shorter time than with the Cunningham Butter Worker.	303 0 0	Dairy Supply Company, Museum Street, London.	Ditto . .	Water can be pressed out of 20 lbs. of butter in 10 minutes.	Government Dairy, Aligarh.	.....
68	Normandie Delaiteuse.	Ditto . .	Water is separated from the butter by centrifugal force: thus the butter grain is not destroyed.	200 0 0	Ditto . .	Ditto . .	There is no wood-work in this machine, and it is therefore specially suitable for this country.	Used at Bareilly Lunatic Asylum only.	It makes the butter more perfectly free from water than other butter workers.

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